REMARKS

Claims 44-62 are presently pending in the case. Claims 1-43 have been cancelled without prejudice or disclaimer, Applicant reserving the right to pursue the claims in related applications. Claims 44-62 have been added.

The amendments are supported by the specification and claims as originally filed.

Information Disclosure Statement

Applicant is filing herewith an information disclosure statement in compliance with MPEP section 609. Indication of consideration of the references provided is requested.
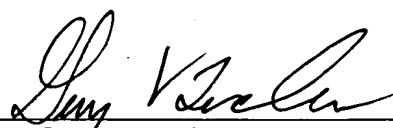
Conclusion

The Examiner is respectfully requested to consider and allow the presently pending claims. Should the Examiner have any questions, the Examiner is requested to call the undersigned at the number given below.

Respectfully submitted,

IMMERSION CORPORATION

Dated: __May 9, 2001__   By:_____

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MARKED-UP VERSION OF AMENDMENTS

In the title:

Please amend the title to read:

--Laparoscopic Simulation Interface--

In the specification:

Before the first line, insert:

--This application is a continuation of copending prior application Serial No. 08/870,956 filed on June 6, 1997, which is a continuation of application Serial No. 08/374,288, filed on January 18, 1995, now U.S. Patent No. 5,731,804, both of which are incorporated herein by reference in their entireties.--

On page 1, line 10, before "Background of the Invention", insert the paragraph:

--This invention was made with Government support under Contract Number III-9361801 awarded by the National Science Foundation, and Contract Number DE-FG03-94ER86008 awarded by the Department of Energy. The Government has certain rights in this invention.--

On page 16, line 25, insert --now Patent No. 5,623,582,-- after "08/275,120".

On page 20, line 8, insert --now Patent No. 5,623,582,-- after "08/275,120".

On page 22, line 35, insert --, which is the parent of file wrapper continuation application Serial No. 08/461,170, now U.S. Patent No. 5,576,727,-- after "invention".

In the claims:

Please cancel claims 1-43 without prejudice or disclaimer.

Please add the following new claims:

44.   An apparatus for interfacing a user with a computer providing a laparoscopic surgical simulation, the apparatus comprising:

a user object comprising a handle and an elongated member;

a gimbal mechanism receiving the user object and allowing the user object to be manipulated in first, second and third rotary degrees of freedom and in a first translational degree of freedom, the gimbal mechanism comprising a five member linkage to provide the first and second rotary degrees of freedom; and

a sensing system coupled to the gimbal mechanism to detect manipulation of the user object in the first, second, and third rotational degrees of freedom and in the first translational degree of freedom;

whereby the sensing system provides input to the computer to control the laparoscopic surgical simulation.

45.   An apparatus according to claim 44 further comprising a handle sensor coupled to the handle to detect manipulation of at least a portion of the handle.

46.   An apparatus according to claim 44 wherein the handle comprises relatively pivotable portions.

47.   An apparatus according to claim 46 further comprising a sensor coupled to · the handle to detect relative motion of the pivotable portions.

48.   An apparatus according to claim 44 wherein the handle comprises a finger wheel.

49.   An apparatus according to claim 44 further comprising a barrier between the handle and the gimbal mechanism.

50.   An apparatus according to claim 44 further comprising a trocar between the handle and the gimbal mechanism.

51. An apparatus for interfacing a user with a computer providing a laparoscopic surgical simulation, the apparatus comprising:

a user object comprising a handle and an elongated member;

a gimbal mechanism receiving the user object and allowing the user object to be manipulated in first, second and third rotary degrees of freedom and in a first translational degree of freedom, the gimbal mechanism comprising a five member linkage to provide the first and second rotary degrees of freedom;

a sensing system coupled to the gimbal mechanism to detect manipulation of the user object in the first, second, and third rotational degrees of freedom and in the first translational degree of freedom; and

an actuator coupled to the gimbal mechanism to output a force to the user in one or more of the degrees of freedom;

whereby the sensing system provides input to the computer to control the laparoscopic surgical simulation and the actuator outputs one or more forces associated with the simulation.

52. An apparatus according to claim 51 wherein the actuator comprises a motor.

53. An apparatus according to claim 51 wherein the actuator comprises a braking mechanism.

54. An apparatus according to claim 51 further comprising additional actuators so that forces may be output in each of the first, second, and third rotational degrees of freedom and in the first translational degree of freedom.

55. An apparatus according to claim 51 further comprising a barrier between the handle and the gimbal mechanism.

56. An apparatus according to claim 51 further comprising a trocar between the handle and the gimbal mechanism.

57.   An apparatus for interfacing a user with a computer providing a laparoscopic surgical simulation, the apparatus comprising:

a user object comprising a handle and an elongated member;

a gimbal mechanism receiving the user object and allowing the user object to be manipulated in first, second and third rotary degrees of freedom and in a first translational degree of freedom;

a sensing system coupled to the gimbal mechanism to detect manipulation of the user object in the first, second, and third rotational degrees of freedom and in the first translational degree of freedom; and

an actuator coupled to the gimbal mechanism through a cable and pulley to output a force to the user in one or more of the degrees of freedom;

whereby the sensing system provides input to the computer to control the laparoscopic surgical simulation and the actuator outputs one or more forces associated with the simulation.

58.   An apparatus according to claim 57 wherein the actuator is coupled to the gimbal mechanism through the cable and pulley to provide a force to the user in the first translational degree of freedom.

59.   An apparatus according to claim 57 wherein the gimbal mechanism comprises a five member linkage to provide the first and second rotary degrees of freedom.

60.   An apparatus according to claim 59 wherein the actuator is coupled to the five member linkage through the cable and pulley to provide a force to the user in the first or second rotary degrees of freedom.

61.   An apparatus according to claim 60 further comprising a second actuator coupled to the five member linkage through another cable and pulley to provide a force to the user in the first or second rotary degrees of freedom.

62.   An apparatus according to claim 57 wherein the cable transmits a force from the pulley to a capstan drum, the capstan drum being coupled to the gimbal.

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